Most old computers just collect dust in the attic after being retired from active service. That's a pity, since there are still useful tasks that could be performed by these relics. In this article, we describe a very simple way to add an optical output to the CD-ROM drive of a cast-off PC. Such an output could for example be used to connect a MiniDisc recorder.

Design by K. Schlott

optical output for CD-ROM drive

a new life for old PCs

Regardless of make, model and price, there is one thing that all computers have in common: they start to age while they are still in the shop. The first wrinkles, which appear after two to three years, can be smoothed out with an update, but a couple of years after that there is not much more that can be done. Then we buy a stylish new model, and the old workhorse lands for good in the attic. Usually, some thought is given to selling the old computer, but if it turns out that little is to be gained by this, most of us would rather hold on to it as a back-up. As a rule, this back-up function is never actually used, and the old beast just sits there for years doing nothing.

This is truly a pity, since an old 386 or 486 PC can still be used quite well for a lot of things. For example, it could be used as the 'brain' of a model train control system, as an advanced roll-down shutter controller or a perfect thermostat for the central heating. The possibilities are almost endless!

If you don't have any particular application for the entire PC, you can still consider looking for new uses for its components. The CD-ROM drive, for example, is in principle ideally suited for playing back to a MiniDisc recorder

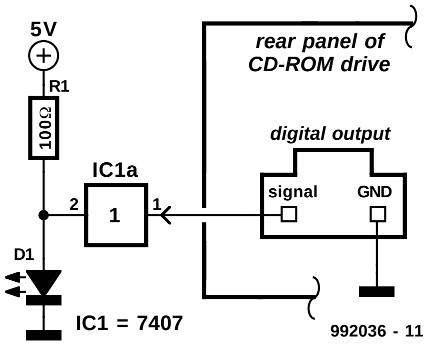

Figure 1. A 'standard' digital output can be converted into an optical output using only three components. The diameter of the LED (2.2 mm) is matched to fiber optic guide. The LED is order code 18 44 11-55 from Conrad Electronic.

Digital out, optical in

The only thing that stands in the way of a successful marriage between a CD-ROM drive and a MiniDisc recorder is that the former has only an electrical digital output, while the latter has only an optical digital input. However, this should not be an insurmountable problem for any self-respecting electronic technician. A quick examination of the digital output of a CDROM drive shows that it provides a trapezoidal biphase signal, with an amplitude of 5 V. With a suitable converter, this can easily be transformed into optical ones and zeros. The well-known TOSLINK modules from Toshiba are made to measure for this task. Still, it's more of a challenge to see if there's a simpler way to implement this conversion — perhaps with a few components that we just happen to have lying around. And in fact, this turns out to be possible. Fifteen minutes of tinkering was all it took to add a perfectly functional optical output to our sample CD-ROM drive, and only three components were needed: a standard TTL buffer, a resistor and a LED. Figure 1 shows how simple it all is.

Next comes the cable. Special optical interconnecting cables are not only fairly expensive, they are also terminated in connectors that only mate with matching components. For a lot less money, you can buy fibre-optic cable by the roll (from Conrad Electronic, for example). If a light-diode is used for D1, the fibre-optic cable can be inserted directly into the hole in the LED package that is provided for this purpose. All that then remains is the question of how to insert the cable into the optical input of the MiniDisc recorder. The cable fits into the opening easily enough — that's no problem — but somehow the signal from the cable seems not to reach the internal circuitry of the recorder. Very strange. After a thorough examination of the optical input connector, we find the culprit: a pesky little miniature switch, built into the connector, that controls the switchover between the analogue and digital inputs. Our cable is just a bit too thin to actuate this switch. The solution to this problem is easy: after a short piece of heat–shrink tubing is fitted over the end of the cable, everything works perfectly!

Remarks

Just to avoid any misunderstanding, it should be noted that the CD-ROM drive need not necessarily be located in an old PC. If you only have a new PC and you want to use its CD-ROM drive as a master for making recordings, you can easily build the circuit described here into the PC. If you fit the LED to on the front panel so that it is readily accessible, you will have no problem making an optical connection to other devices.

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